Do hospital physicians have a role in reducing antibiotic prescribing in the community?

John Macfarlane, W F Holmes, Rosamund Macfarlane

Recent reports from the Audit Commission and the House of Lords Select Committee on resistance to antibiotics have both been critical of general practitioner (GP) prescribing for the excessive use of antibiotics in respiratory illness, the increasing antibiotic resistance of respiratory pathogens, and excessive drug costs in the community. Such criticism of GPs is not new and appears to have little effect on prescribing habits. Why do all doctors prescribe antibiotics so often, is this behaviour amenable to change, and what does it have to do with hospital physicians?

If changes in prescribing in the community are to be achieved, there probably needs to be a better appreciation of the issues which drive it. This understanding is important, not only for those working in primary care, but also for those in hospital practice. Respiratory physicians and microbiologists teach and influence GPs, medical students, and junior doctors. Their advice and example is important but is less influential, especially in primary care, if it does not also reflect and address the difficulties experienced by doctors who have to treat patients whose attitudes and expectations may differ significantly from their own.

This review highlights some of the issues behind dependence on antibiotic prescribing, particularly for respiratory disease. It focuses on managing the commonest presentation of acute respiratory illness: a previously well adult consulting with a new episode of cough and other lower respiratory tract symptoms. This is often called “acute bronchitis”, an imperfect diagnostic label. For most of these patients the doctor is uncertain whether antibiotics are indicated, but still prescribes them.

Lower respiratory tract illness

Acute lower respiratory tract illness results in many thousands of consultations in primary care and a significant number of acute medical admissions each year. The management of adults admitted to hospital with community acquired pneumonia receives much attention, but, as illustrated by the pyramid in fig 1, such cases represent a small proportion of acute lower respiratory tract illness occurring in the community. Indeed, an iceberg may be a better analogy than a pyramid as this illness is hidden from hospital physicians below the surface. About a quarter of patients with symptoms seek medical attention and very few need to be admitted to hospital. About 5% of adults treated by their GP for a lower respiratory tract infection have pneumonia on the chest radiograph; of these, only 20% will be admitted to hospital and 5–10% of these may die and/or require intensive care management. In spite of this range of severity, diagnostic labels and typical management are strikingly uniform—namely, diagnosing infection and prescribing antibiotics.

The problems of disease and definitions

The sharpness of the divisions suggested in fig 1 is clearly unrealistic. As one descends from the top of the iceberg, frequency increases, classification blurs, and issues reflecting the patient and the circumstances of the consultation become increasingly important. It is in this area that most GPs work.

Infections which require antibiotics—caused by bacteria and atypical organisms—are found in a proportion of patients admitted to hospital with pneumonia and do occur in some adults in the community with pneumonia and lower respiratory tract infection. However, much...
lower respiratory tract illness may not be due to infection at all and many confirmed infections are viral rather than bacterial which, in most patients, are probably self-limiting. This view is supported by studies which show that antibiotics have little impact on the duration of symptoms of either acute bronchitis or many acute exacerbations of chronic obstructive pulmonary disease in the community. The majority of British GPs seem uninfluenced by this evidence for they prescribe antibiotics to about 75% of these patients, a practice shared by European physicians. It seems reasonable to suspect that strategies that rely on antibiotics to manage the more severe episodes at the top of the iceberg, and the labels that describe them as “infection”, may not be so appropriate for those at the bottom.

Problems of definitions have bedevilled both clinical practice and research, especially in primary care. British GPs rarely perform investigations when diagnosing and prescribing for lower respiratory tract illness. Even in hospital, where the diagnosis can be supported by laboratory and radiology findings, up to three quarters of patients initially diagnosed with a chest infection receive concurrent treatment for other conditions such as pulmonary infarction and heart failure until the diagnosis becomes clearer. GPs use a wide variety of diagnostic labels when patients present with acute lower respiratory tract symptoms. A term implying infection—for example, “bronchitis”, “chest infection”, or “lower respiratory tract infection”—may be chosen only after the doctor has decided to prescribe antibiotics perhaps to justify that decision. Indeed, describing the illness to patients in terms of “infection” makes not prescribing antibiotics more difficult.

In the 1970s Howie and colleagues, in a series of important studies, offered a new insight into the management of respiratory illness in primary care. They described an “urgent need . . . to define general practice illness in terms of its presenting signs and symptoms . . . so that objective respiratory symptoms may be recognised and studied with a view to deciding appropriate treatment”. Their challenge remains largely unanswered and is still timely: developing guidelines for the use of novel and expensive antiviral therapies for self-limiting acute lower respiratory tract illnesses will require a clear understanding of these issues.

Why do patients consult with acute lower respiratory tract symptoms?

Patients consult because their symptoms distress them and those around them. Cough is the cardinal feature of an acute lower respiratory tract illness. It demands attention from family, friends and work mates and it disturbs the sleep of patients and their household. Verheij et al found that 90% of patients with acute bronchitis consulted their general practitioner because they were annoyed by the cough, two thirds had disturbed sleep, and nearly half consulted because of pressure from family and friends. We found very similar results: common reasons for consultation for previously well adults with acute lower respiratory tract illness were the troublesome nature of the symptoms (92%), being prompted to consult by family and friends (46%), and for reassurance that it is not serious (39%). Cornford found that patients with a cough who consulted their GP were more worried about it and were more likely to feel that it was abnormally severe and was interfering with their social activities than patients with a cough who did not consult.

There are parallels with other conditions. Little et al found that between one third and two thirds of patients with a sore throat consulted only to legitimise their illness for family and friends or for work purposes. Thus, patients may not necessarily consult because of the features which doctors would consider “severe” but because their symptoms concern them or those around them. They also do not wish to be denied access to medication which they feel to be effective: there is a strongly held and widespread belief among patients that infection is the problem and antibiotics are the answer. This view, together with the doctor’s willingness to prescribe them, provides fertile ground for a spiral of demand and supply.

In studies of over 2000 patients in primary care we noted that the decision to prescribe antibiotics for acute lower respiratory tract illness was influenced by non-clinical factors in nearly half of cases, common among which is the GP’s desire to reduce re-attendance. Re-consultation during lower respiratory tract illness is very common with about one quarter of patients re-consulting once or more within a month of the index consultation. Over half will receive a further antibiotic even though evidence of active infection warranting an antibiotic is very unusual.

GPs clearly recognise these influences, being willing to record that over three quarters of their own antibiotic prescriptions are not definitely clinically indicated (table 1). They acknowledge that patient pressure commonly influences their prescribing. Doctors may, however, overstate this pressure, perhaps to rationalise prescribing when they doubt the clinical indication but have neither time nor a strategy to react differently. GPs report that decisions about antibiotics and respiratory illness are the two commonest causes for prescribing discomfort. It is therefore clear that patients and doctors interact in a complex way in even apparently simple prescribing decisions.
Data taken from Macfarlane et al previously well adults treated with antibiotics for an acute lower respiratory tract illness. Antimicrobial treatment for viral respiratory tract infections is unnecessary and potentially harmful. In this small group symptoms reflect bacterial or atypical respiratory infection. Antibiotics may modify either the severity or duration of the symptoms. In our analogy this will flatten and/or lower the curve in fig 2, reducing the area above the trigger line. But this is relatively uncommon, as randomised controlled trials suggest there is little or no benefit from antibiotics for most patients. This group probably includes some of the small proportion of patients with acute lower respiratory tract illness for whom their GP is confident that antibiotics are definitely clinically indicated (table 1).

### Table 1 The certainty of the decision to prescribe recorded by general practitioners for 1473 previously well adults treated with antibiotics for an acute lower respiratory tract illness.

<table>
<thead>
<tr>
<th>Certainty of decision</th>
<th>% of cases (n)</th>
</tr>
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<tbody>
<tr>
<td>Antibiotics definitely indicated</td>
<td>19% (285)</td>
</tr>
<tr>
<td>Antibiotic probably indicated</td>
<td>56% (820)</td>
</tr>
<tr>
<td>Antibiotic probably not indicated</td>
<td>24% (350)</td>
</tr>
<tr>
<td>Antibiotic definitely not indicated</td>
<td>1% (18)</td>
</tr>
</tbody>
</table>

Minority group (19%): where GP is increasingly uncertain that antibiotics are clinically indicated but still prescribes. Alternative management strategies should be focused on this group.

Majority group (81%): where GP is confident to prescribe Antibiotics definitely indicated 19% (285)

Antibiotic probably indicated 56% (820)

Antibiotic probably not indicated 24% (350)

Antibiotic definitely not indicated 1% (18)

PATIENTS IN WHOM THE NATURAL HISTORY OF THE SYMPTOMS ARE NOT MODIFIED BY ANTIBIOTIC THERAPY BUT THE GP FEELS PRESCRIBING IS THE ONLY PRACTICAL OPTION

This is the much larger group of patients where the GP is uncertain whether antibiotics are indicated but still prescribes them—about 80% of cases in our studies. An antibiotic probably does not modify the natural history of the disease but it does influence the patient’s belief in the need to see a doctor and to receive antibiotics for subsequent episodes, thus developing a cycle of re-consultation.

This further prescription reinforces dependence on this strategy for future episodes, lowering their trigger line. We found that the most powerful predictor of re-consultation was prior consulting habit. Little et al have shown that patients prescribed an antibiotic for sore throat are more likely to re-consult for future episodes due to “medicalisation” of the condition.

GP’s most commonly prescribe antibiotics for acute lower respiratory tract illness for five or seven days, by which time symptoms have rarely subsided. In a quantitative systematic review of randomised placebo controlled trials of antibiotics for acute bronchitis, Fahey et al calculated that only 9% of patients treated with antibiotics reported improvement after 11 days. Patients usually re-consult around eight or nine days after their initial consultation—that is, about two days after finishing their antibiotics. Having been told they have an “infection” and given antibiotics to cure it, patients not unreasonably assume that their failure to respond results from too short a course and/or the wrong antibiotic.

### The way forward

**UNHELPFUL STRATEGIES**

We feel confident that the way forward is not by searching for new or more effective antibiotics, or by providing GPs with expert advice from...
secondary care or government that “you should not prescribe antibiotics.”13 41 Lower respiratory illness is often managed in less ideal circumstances—empirical treatment, busy clinics, out of hours consultations—and when patients often have unrealistic expecta-
tions.

A MORE HELPFUL STRATEGY: ADJUSTING THE TRIGGER LINE
A better way forward may be to seek to alter patient behaviour and expectations—in our analogy, to raise the trigger line. This means not providing a prescription and a convenient clinico-pathological label but to assess the like-
lihood of antibiotics modifying the illness and, where they will not, to identify the real reason for consultation. Reaching common ground between doctor and patient without the patient feeling “fobbed off” or rejected is far from easy, but works to the benefit of the practice and the patient.31

PATIENT AND COMMUNITY STRATEGIES
Education and information reduces depend-
ence on and belief in the value of antibiotics in the community for minor illness. The Depart-
ment of Health’s National Advice to the Public campaign (NAP) will be ineffective without support.41 NAP initiatives in primary care, the National Cam-
paign on Antibiotic Treatment (CAT), recommends “no prescribing of antibiotics for simple coughs and colds” as the first of four objectives for GPs.41 Doctors need to be aware of and have confidence in evidence based recommend-
dations that antibiotics have little benefit in the management of most consultations for lower respiratory tract illness.41 Educating doctors in this way can reduce inappropriate use of antibiotics.41 Reassurance and education at the initial consultation takes longer than prescrib-
ing but results in more satisfied patients43 and is one of very few studies demonstrating benefit from a non-pharmacological intervention. We need to research other novel approaches.

DOCTOR STRATEGIES
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RESEARCH STRATEGIES
More research is certainly needed. We have yet to develop ways of confidently identifying at presentation those patients in whom antibiotics will prove effective and those in whom they will not. For example, although a fifth of patients with the common cold may have a secondary nasopharyngeal bacterial infection and derive some minor benefit from antibiotics, they cannot be identified at presentation.43 However, it is clearly difficult; thoughtless pursuit of this benefit—which means giving antibiotics to everyone with a common cold “to be sure”—is a policy likely to fuel expectation and demand.

Our term “lower respiratory tract illness” describes briefly a simple and intuitive symp-
tom complex which GPs can identify and record easily within a routine consultation. Encouraging the development of a common nomenclature for use in research would produce studies whose results could be more easily compared and applied in clinical prac-
tice.

Patients are not a homogeneous group; it is unlikely that any one educational intervention will prove universally effective. However, a simple information leaflet explaining the natu-
ral history of lower respiratory tract illness did significantly reduce re-consultation38 and is one of very few studies demonstrating benefit from a non-pharmacological intervention. We need to research other novel approaches.

Conclusions
Learning to use antibiotics wisely for acute res-
piratory symptoms is not easy and is not just a task for doctors in primary care. The teaching which undergraduates and trainees receive about respiratory infection from hospital based physicians has a powerful effect upon their future practice, whatever speciality they choose. Teaching should not just follow traditional approaches such as the treatment of “pneumonia” and “bronchitis”, but reflect the spectrum of acute respiratory illness, the often difficult pressures on prescribers, and the importance of learning the skills to cope with them. Developing joint teaching with depart-
ments of primary care may be particularly helpful for undergraduates, and the supervi-
sion of what trainees in medicine do and say demonstrates to GPs that hospital doctors appreciate these issues and support their efforts.

Concerns about overuse and over-reliance on antibiotics for respiratory illness are not new, yet these conditions continue to be poorly managed because of doctors’ dependence on prescribed medication. Recommended management strategies should change to focus on techniques which raise the trigger line of indi-
vidual patients and also the community. In this
way we may reduce the distress caused to patients, their families, and to the community by this range of common, incompletely understood, and currently poorly managed symptom complex.

How might we improve the management of lower respiratory tract illness in primary care?

1. Use a consistent nomenclature.
2. Discourage the use of labels such as "chest infection" and "bronchitis" which imply disease, the presence of infection, and the need for antibiotics.
3. Use open labels such as "chesty cough" which describe the symptom complex but do not drive the prescribing decision for antibiotics.
4. Recognise the long natural history
5. Develop educational materials which explain this natural history and the lack of benefit for antibiotics to both individual patients and the community in most situations.
6. Encourage a better understanding of the issues by secondary care specialists.
7. Direct prescribing to answering questions such as: (a) which patients benefit from antibiotics, and how to identify them in routine consultations? (b) what is the spectrum of pathogens in lower respiratory tract illness? (c) which education strategies reduce antibiotic prescribing?

The following three questions merit further study:

- When there is uncertainty in the doctors' decision to prescribe antibiotics, is sharing that uncertainty and involving the patient in the prescribing decision a useful strategy?
- Do psychological markers of health seeking behaviour offer an insight into why some patients consult for lower respiratory tract illness?
- Do episodes of lower respiratory tract illness have predictive value as a marker of the subsequent development of airways disease?

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